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Original research article

PHYSICAL ACTIVITY OF ELDERLY URBAN AND RURAL WOMEN

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Sonja Dondur

Faculty of Sport and Physical Education, University of Niš, Serbia

Abstract. *As the natural process of aging inevitably brings numerous structural and morphological changes in the body, the aim of this study was to analyze the level of physical activity in relation to the BMI in older women in urban and rural areas. A sample of 654 participants, aged 60 to 80 years, from South-East Serbia, in relation to the Body Mass Index- BMI, was divided into groups of normal weight (n=298), overweight (n=255) and obese (n=101) individuals. In this research, the IPAQ questionnaire for self-evaluation was used, that included four types of physical activity: related to work, transportation, housework/poultry and orchard and leisure. Three levels of physical activity recommended for classifying populations are low, moderate and high. The results indicate that if one takes into account the level of nutrition, there is a statistically significant difference between women in urban and rural normal weight (p=.00) in physical activities related to housework (p=.00) and moderate physical activity (p=.01). The research has indicated that women overall with increased weight and overweight women from urban and rural areas have the same level of physical activity.*

Key words: *physical activity, urban area, rural area, elderly women, IPAQ questionnaire.*

INTRODUCTION

Successful aging encompasses multiple dimensions of health, including physical, functional, social and psychological well-being (Phelan, Anderson, LaCroix, & Larson, 2004). Many transparent and research studies point to the benefits of increased physical activity in order to reduce chronic diseases in the elderly population (Hambrecht et al., 2004; Helmrich, Ragland,

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Corresponding author: Sonja Dondur
University of Niš, Faculty of Sport and Physical Education, Čarnojevića 10a, Niš, Serbia
Phone: +381 18 510 900 • E-mail: sdondur28@gmail.com

& Paffenbarger, 1994; Hoidrup et al., 2001; Hu et al., 2005; Laaksonen et al., 2005; McTiernan et al., 2003; Schnohr, Scharling, & Jensen, 2003; Whelton, Chin, Xin, & He, 2002). Physical activity, as a means of reducing morbidity and mortality (Bouchard, Blair, & Haskell, 2007) is reflected in the reduction of body weight and percentage of body fat, blood pressure, lipid levels and glucose. Also, it has been proven that physical activity reduces the risk of diabetes, hypertension, cancer and almost all causes of mortality (Di Pietro, 2001; Lim & Taylor, 2005).

Incorrect, insufficient and irregular physical activity has become an integral part of everyday life, the level of physical activity of women is lower compared to men, and that relationship continues to decline with age (Caspersen, Pereira, & Curran, 2000). Physical inactivity is associated with an increased risk of coronary artery disease, obesity, hypertension and diabetes (Bouchard et al., 2007; Patterson, Moore, Probst, & Shinogle, 2004).

Research shows that there are significant differences in the health status of people from urban and rural areas, especially in developing countries. The urban way of life leaves the individual no time to devote to serious improvement of their physical or mental health. This is a problem that modern society faces and needs to be resolved in an appropriate manner. Studies have shown that the rural population has far lower rates of participation in physical activity, rather than the urban or near urban population (Scharff, Homan, Kreuter, & Brennan, 1999; Parks, Housemann, & Brownson, 2003; Patterson et al., 2004; Fogelholm et al., 2006), including the one that shows that about 46% of rural adults live a sedentary lifestyle (Eaton, Nafziger, Strogatz, & Pearson, 1994), which is defined as the absence of participation in any physical activity less than once a week (Eaton et al., 1994). There are several reasons for the difference, which usually include limited financial resources and social isolation, which is more common among women in rural compared to urban areas (Carruth & Logan, 2002). Persons in rural areas have less access to facilities for physical activity, and reduced mobility of their communities, and we should add that they are less educated and poorer than people from urban areas (Shores, West, Theriault, & Davison, 2009; Patterson et al., 2004), which can contribute to a lower level of physical activity in rural areas. People living in rural areas are often a neglected population (Nothwehr & Peterson, 2005) with a high number of obese and overweight people (Patterson et al., 2004), frequently suffering from chronic diseases than people in urban areas, while being influenced by the level of participation in physical activity (Jones, Parker, & Ahearn, 2009).

Promoting physical activity is a top priority for the improvement of public health (Haskell, Blair, & Hill, 2009). According to the research of the Institute of Public Health of Serbia (IPHS) in 2000, prepared for each district in Serbia, it is considered that physical inactivity, as a risk factor, is the dominant factor in the population of North Banat. In their spare time, 76.6% of adults never engage in any sports or recreation. In their spare time men, younger and more educated people go in for sports and recreation, much more often than women do (IPHS, 2012).

Experiences in the world and in our country show the necessity of changes in risk behavior and the formation of healthy habits as part of a healthy lifestyle, with the aim of preserving and improving the health of the population (IPHS, 2008). The importance of physical activity for the good health of every person is considered in a more complete analysis of the causes of death in Serbia. According to data from 2006, compiled at the IPHS, the most important and most common risk factors for health are physical inactivity in leisure time (67.7%), followed by high blood pressure above 120/80mmHg (46.5%), alcohol (40.3%), tobacco use (33.6%) and obesity (18.3%). Based on data from 2003, the

most significant risk factor for women is high blood pressure (17.5%), followed by physical inactivity (16.3%), tobacco use (12.5%), obesity (12.2%), elevated blood cholesterol levels (1.7%) and (1.5%), alcohol (IPHS, 2012).

Therefore, the aim of this research was to determine the level of physical activity in relation to the BMI in older women in urban and rural areas. It was used a transversal analysis on a large sample, defined as a population of females from South-East Serbia, aged from 60 to 80.

THE METHOD

The sample of participants

A sample of 974 participants, aged 60 to 80, from South-East Serbia was divided based on the Body Mass Index-BMI, into groups with normal weight (n=298), overweight (n=255) and obese (n=101).

The classification of the participants into groups with normal body weight, increased weight and overweight was done on the basis of the Body Mass Index (BMI). To calculate the value of BMI, a standard procedure was used, BMI=body weight (kg)/body height (m^2) (Seidell & Flegal, 1997; WHO, 1997; American College of Sports Medicine, 2006). Women with normal weight were considered those whose BMI ranged from 18:50 to 24.99 kg/m^2, while the value of BMI of women with increased weight ranged from 25.00 to 29.99 kg/m^2, and the value of BMI for overweight women > 29.99 kg/m^2 (WHO, 1997).

Participation in the study was voluntary. The participants were informed about the specific instructions for filling out the questionnaire. A standard interview was carried out individually or in small groups, in their homes or in centers for the elderly.

The procedures

Self-assessment of the physical activity of participants was carried out using the International Questionnaire IPAQ-International Physical Activity Questionnaires (Craig, et al., 2003). The questionnaire contained four types of physical activities related to: business, transport, housework/gardening and leisure. Three levels of physical activity recommended for classifying the population are low, moderate and high. Self-assessment exercise was carried using the Serbian version of the IPAQ questionnaires, the reliability of which was confirmed in the research of Milanović, Pantelić, Trajkovic, Jorgić, & Sporiš (2014). In each of the four areas of testing, the participants record the number of days and time spent in the course of each day involved in physical activity, separately for high-intensity activity, moderate intensity, and time spent walking. Then for each domain (activity of high intensity, moderate physical activity and walking were calculated separately), including the level of these activities, according to the official IPAQ instructions. In this way it was possible to determine the level and intensity of the physical activity. Also, the metabolic equivalent (MET) was calculated for each domain separately (physical activity during leisure time, physical activity at home and in the garden, physical activity at work and physical activity related to travel to work and back). The total weekly level of physical activity (MET-minutes/week) is calculated by adding the values for each item. To calculate the level indicators of physical activity, the following was used: high-intensity physical activity=8.0 MET, moderate-intensity physical activity=4.0 METs

and walking=3.3 METs. These values are in accordance with the official guidelines and display IPAQ physical activity of varying intensity (Ainsworth et al., 2000; Ainsworth et al., 2011). The intensity of physical activity is classified into three categories: low, moderate and high.

High intensity. Physical activity of high intensity is defined as an activity in which participants breathe more deeply than usual. These can be activities like lifting heavy things, digging, hard work in building, climbing stairs, etc. A person classified in the category of high physical activity reaches one of the following criteria: the intensity of the activity of at least 1,500 MET-minutes/week for at least 3 days a week, or 7 or more days in any combination of walking, moderate or high intensity activity, where a minimum of at least 3,000 MET-minutes/week is achieved.

Moderate intensity. Physical activities of moderate intensity are those in which breathing is done a little harder than usual and can include activities such as carrying light loads and others. A person who does not meet the criteria for "high" intensity of physical activity and is not in that category, but fulfills some of the following criteria: three or more days of moderate intensity physical activity at least 20 minutes a day, five or more days of moderate intensity physical activity, from walking for at least 30 minutes a day, five days or more of any combination of walking, moderate or high-intensity activities which are achieved by a minimum of at least 600 MET-minutes/week. Activities of high and moderate intensity are the ones that last for at least ten minutes in continuity.

Low intensity. A person who does not meet any of these criteria falls into this category.

Statistical analysis

The obtained data were processed using the statistical package STATISTICA 7.0 (StatSoft, Inc., Tulsa, OK, USA). For each variable the following parameters of descriptive statistics were calculated: mean (Mean), the minimum value (Min), the maximum value (Max), the range (Range), standard deviation (Std. Dev.) and the standard error of arithmetic mean (St.error). To determine the differences between groups, we used a multivariate analysis of variance (MANOVA) (Malacko & Popović, 2000). Determining the differences between groups for each variable was conducted using the univariate analysis of variance (ANOVA), and the level of significance of differences is shown as p.

RESULTS

Table 1 shows the results which suggest that women with normal weight and obese women are more physically active than overweight ones, if you take into account their overall physical activity. In terms of energy consumption estimated by the IPAQ questionnaire TotalMET3- moderate physical activity (2139.40 2253.13 compared to 2090.53) Total housework (2654.25 compared 3004.68 2779.07), dominant in relation to other forms of physical activity. The least values have been found in the Total vigorous physical activity MET- higher intensity (163.48 to 297.57 by 99.59).

Table 1 Basic statistical parameters of physical activity of the respondents from urban and rural areas with different degrees of nutritional status (Mean)

	Normal weight (n=298)	Overweight (n=255)	Obese (n=101)
TotalMET1	441.08	572.84	232.31
TotalMET2	627.28	565.72	495.82
TotalMET3	2139.40	2253.13	2090.53
TotalMET4	590.33	964.18	713.37
TOTAL walking	1083.39	1111.61	745.77
TOTAL moderate	2654.25	3004.68	2779.07
TOTAL vigorous MET	163.48	297.57	99.59
TOTAL physical Activity	3609.68	572.84	3487.97

Legend: Wilk's Lambda- Test Wilks' lambda, F- Ra approximation, df - degrees of freedom, p level- level of significance, TotalMET1- work-related, TotalMET2- Total transportation, TotalMET3- Total housework, TotalMET4- Total leisure-time, TOTAL walking- total walking, moderate- TOTAL moderate physical activity, TOTAL MET- vigorous physical activity of high intensity, physical TOTAL Activity-total physical activity.

Table 2 Multivariate and univariate analysis of variance of women of normal weight in urban and rural areas

	F	p
TotalMET1	1.78	0.18
TotalMET2	0.22	0.64
TotalMET3	10.09	**0.00**
TotalMET4	0.01	0.94
TOTALwalking	2.69	0.10
TOTALmoderate	7.51	**0.01**
TOTALvigorousMET	0.36	0.55
TOTALphysicalActivity	1.69	0.19
Wilks= .92 F=3.91^{c} df(1,2) 6.00, 260.00 p-level=.001		

Legend: Wilk's Lambda- Test Wilks' lambda, F- Ra approximation, df - degrees of freedom, p level- level of significance, TotalMET1- work-related, TotalMET2- Total transportation, TotalMET3- Total housework, TotalMET4- Total leisure-time, TOTAL walking- total walking, moderate- TOTAL moderate physical activity, TOTAL MET- vigorous physical activity of high intensity, physical TOTAL Activity-total physical activity.

Table 2 shows the results of the multivariate analysis of variance between women of normal weight in urban and rural areas. It can be concluded that there is a statistically significant difference between groups (p=.001). The results of the univariate analysis of variance showed a statistically significant intergroup difference in the variables of physical activity in relation to housework - TotalMET3 (p=.000), and moderate physical Activity - TOTALmoderate at a significance level of .01 (p=.000).

Table 3 Multivariate and univariate analysis of variance overweight urban and rural women

	F	p
TotalMET1	0.95	0.33
TotalMET2	3.80	**0.05**
TotalMET3	0.03	0.87
TotalMET4	0.01	0.94
TOTALwalking	3.01	0.08
TOTALmoderate	0.02	0.88
TOTALvigorousMET	0.01	0.93
TOTALphysicalActivity	0.36	0.55
Wilks=.97 F=1.10[c] df(1,2) 6.00, 208.00 p-level=.364		

Legend: Wilk's Lambda- Test Wilks' lambda, F- Ra approximation, df - degrees of freedom, p level- level of significance, TotalMET1- work-related, TotalMET2- Total transportation, TotalMET3- Total housework, TotalMET4- Total leisure-time, TOTAL walking- total walking, moderate- TOTAL moderate physical activity, TOTAL MET- vigorous physical activity of high intensity, physical TOTAL Activity-total physical activity.

Table 3 shows the results of a multivariate analysis of variance between women with increased weight in urban and rural areas. The analysis shows that at the multivariate level there is no significant intergroup difference (p=.364), and women with increased weight in urban and rural have the same level of physical activity. By analyzing the results of the univariate analysis of variance of the applied variables, it can be seen that there is a statistically significant intergroup difference only for the variable physical activity-related transport TotalMET2 (p=.050).

Table 4 Multivariate and univariate analysis of variance between obese urban and rural women

	F	p
TotalMET1	0.10	0.75
TotalMET2	0.49	0.49
TotalMET3	2.13	0.15
TotalMET4	0.88	0.35
TOTALwalking	2.73	0.10
TOTALmoderate	0.19	0.67
TOTALvigorousMET	0.31	0.58
TOTALphysicalActivity	0.00	0.95
Wilks=.89 F=1.59[c] df(1,2) df(1,2) 6.00, 80.00 p-level=.161		

Legend: Wilk's Lambda- Test Wilks' lambda, F- Ra approximation, df - degrees of freedom, p level- level of significance, TotalMET1- work-related, TotalMET2- Total transportation, TotalMET3- Total housework, TotalMET4- Total leisure-time, TOTAL walking- total walking, moderate- TOTAL moderate physical activity, TOTAL MET- vigorous physical activity of high intensity, physical TOTAL Activity-total physical activity.

Table 4 presents the results of a multivariate analysis of variance between obese women in urban and rural areas. It can be concluded that at the multivariate level there are no significant intergroup differences in the studied area (p=.161). An analysis of the results of the univariate analysis of variance of the applied variables also did not show a statistically significant intergroup difference.

DISCUSSION

If we take into account the overall physical activity of women in the South-East Serbia (Table 1), it can be noticed that overweight women in urban and rural areas are significantly physically more inactive compared to overweight women and women with normal weight. Pantelić et al. (2013) obtained a numerical difference in favor of women in rural areas in the field of home affairs, moderate physical activity, physical activity of high intensity and total physical activity, while greater knowledge of the total work, physical activity related to transport, physical activity in leisure and hiking, was found in women from the urban environment.

This research has shown that women from urban and rural areas with increased weight and obese women have about the same level of physical activity, but women in urban and rural areas with normal weight, are statistically significantly different (p=.001) in physical activities related to home jobs and moderate physical activity. It can be concluded that the two types of physical activity practice are closely linked with respect to a specific way of life of women of rural areas. Housework in urban areas is usually confined to the maintenance of the house, as opposed to rural households, which mostly consist of the house, outbuildings and land. According to the Árnadóttir, Gunnarsdottir, & Lundin-Olsson (2009), in urban and rural areas, most physical activities are related to housework, with rural women showing higher values than urban women.

Although women in urban and rural areas with increased weight have the same level of physical activity, a statistically significant difference at the univariate level was found in physical activities related to transportation. Women from urban areas are physically active in the field of transport, because women in rural areas are more dependent on motor vehicles because of the low population density and poor road network (Sallis, Frank, Saelens, & Kraft, 2004; Savitch, 2003). These factors cause urban women to complete their daily activities without a motor vehicle. Based on that, place of residence can only partially affect the parameters of physical activity of old women. Árnadóttir, Gunnarsdottir, & Lundin-Olsson (2009) came to the conclusion that the overall level of physical activity is not associated with rural, compared to urban areas; therefore, the elderly in rural areas should not be labeled as less physically active than those who live in urban areas.

Similar results were determined by the authors Pantelić et al. (2013). The authors conclude that women from urban areas have a higher level of physical activity in relation to transport and pedestrians, as compared to women from rural areas. The authors conclude that place of residence only partially affects the parameters of physical activity of old women. The results of the authors Milanović et al. (2013) indicate that the metabolic equivalent values in total physical activity of women older than 60 can significantly reduce with aging, but from the standpoint of energy consumption estimated by IPAQ questionnaire, moderate physical activity should be the predominant type.

Overall, this study has shown that there is no difference in physical activity between women with normal weight in urban and rural areas.

The contribution of this research is reflected in the large number of females in the surveyed population aged over 60. Although an indirect estimation of the level of physical activity was determined by the IPAQ questionnaire, we obtained relevant data on the physical activity of women, as well as on the degree of nourishment. Future research should examine the impact of various forms of physical activity, but also promote regular participation in these physical activities in order to preserve health.

CONCLUSION

In this study it was concluded that women from urban and rural areas with normal weight and overweight women are more physically active than overweight women, if you take into account their overall physical activity. However, if we take into account the BMI, a statistically significant difference was found in women with normal weight in terms of physical activity related to housework and moderate physical activity. Practically, these two aspects of physical activity are closely linked due to the specific way of life in rural areas. Thus, it was found that the place of residence can only partially affect the parameters of physical activity of old women, of different degrees of nutritional status.

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FIZIČKA AKTIVNOST STARIJIH ŽENA URBANE I RURALNE SREDINE

Kako prirodni proces starenja neminovno nosi mnogobrojne strukturne i morfološke promene u organizmu, cilj ovog rada bio je da se analizira nivo fizičke aktivnosti u odnosu na stepen uhranjenosti, kod starijih žena urbane i ruralne sredine. Uzorak od 654 ispitanice, starosti od 60 do 80 godina, sa područija jugoistočne Srbije, podeljen je u odnosu na Body Mass Index- BMI, u grupu sa normalnom težinom (n=298), prekomernom težinom (n=255) i u grupu gojaznih (n=101). U ovom istraživanju je korišćen IPAQ upitnik za samoevaluaciju koji je sadržao četiri tipa fizičke aktivnosti: vezanu za posao, transport, kućne poslove/vrtarstvo i dokolicu. Tri nivoa fizičke aktivnosti preporučene za klasifikaciju populacije su: nizak, umeren i visok. Rezultati ukazuju, da ukoliko se uzme u obzir stepen uhranjenosti, postoji statistički značajna razlika između žena urbane i ruralne sredine sa normalnom težinom (p=.00), *u fizičkoj aktivnosti u vezi sa kućnim poslovima* (p=.00) *i umerenoj fizičkoj aktivnosti* (p=.01). *Istraživanje je sveukupno ukazalo da žene sa povećanom težinom i gojazne žene urbane i ruralne sredine imaju isti nivo fizičke aktivnost.*

Ključne reči: *fizička aktivnost, urbana sredina, ruralna sredina, starije žene, IPAQ upitnik.*